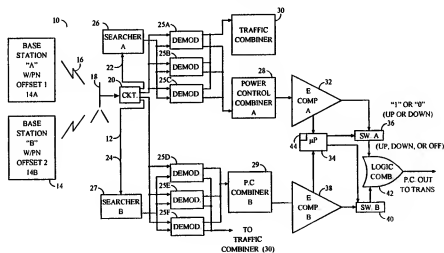




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/US98/17528 <b>(22) International Filing Date:</b> 24 August 1998 (24.08.98) <b>(30) Priority Data:</b> 08/919,806 29 August 1997 (29.08.97) US <b>(71) Applicant:</b> QUALCOMM INCORPORATED [US/US]; 6455 Lusk Boulevard, San Diego, CA 92121 (US). <b>(72) Inventors:</b> SAINTS, Keith, W.; Apartment 4212, 7160 Shoreline Drive, San Diego, CA 92122 (US). TIEDEMANN, Edward, G., Jr.; 4350 Bromfield Avenue, San Diego, CA 92122 (US). <b>(74) Agents:</b> MILLER, Russell, B. et al.; Qualcomm Incorporated, 6455 Lusk Boulevard, San Diego, CA 92121 (US).		<b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BI, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> <b>(88) Date of publication of the international search report:</b> 27 May 1999 (27.05.99)

**(54) Title:** METHOD AND APPARATUS FOR PROCESSING POWER CONTROL SIGNALS IN A MOBILE TELEPHONE SYSTEM

**(57) Abstract**

The transmitted power of a mobile telephone (12) is established by power control bits that are transmitted in a traffic channel from a base station (14A, 14B) and that are demodulated by a rake receiver (22, 24) in the telephone. The rake receiver includes a plurality of demodulators (25a to 25f) that demodulate respective fingers of the traffic channel which may be caused by multipath conditions, with the power control bits from each demodulator being combined with the power control bits of the other demodulators in the rake receiver regardless of whether the demodulators (25a to 25f) are in lock with their respective fingers. The combined power control signal from a rake receiver (22, 24) associated with a first base station (14A, 14B) is then tested against a threshold. If the combined power is at least equal to the threshold, the combined power control signal is sent to a logic combiner (42). If other base stations are communicating with the mobile telephone, the combined power control signal from each of these other base stations is also sent to the logic combiner (42). If any power control signal commands the mobile telephone to decrease its transmitted power, it does so; otherwise, it increases its transmitted power. Alternatively, the power control bits from each demodulator in a rake receiver (22, 24) can be blocked if the finger energy falls below a threshold that depends on the number of fingers from the associated base station.

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According to International Patent Classification (IPC) or to both national classification and IPC

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X  A	WO 95 08901 A (NOKIA TELECOMMUNICATIONS OY ;JOLMA PETRI (FI); UOLA RISTO (FI)) 30 March 1995 see abstract  see page 1, line 5-17 see page 2, line 16 - page 3-30 see page 4, line 20 - page 5, line 16 see page 7, line 19-26 see page 8, line 27 - page 9, line 25 see figures see claims  ---  -/-	11   1-10, 12-35

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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## INTERNATIONAL SEARCH REPORT

Int. Application No.

PCT/US 98/17528

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 5 640 414 A (BLAKENEY II ROBERT D ET AL) 17 June 1997  see column 12, line 7-24  see column 12, line 58 - column 13, line 19  see column 13, line 58 - column 14, line 5  see column 28, line 3-17  see figures 1,2  ---</p>	1-35
A	<p>EP 0 671 819 A (ROKE MANOR RESEARCH) 13 September 1995  see abstract  see column 1, line 1-46  see column 2, line 16-47  see column 4, line 6-56  see figure 3  see claims 1,3,4,7  ---</p>	1-35
A	<p>EP 0 680 160 A (NIPPON TELEGRAPH &amp; TELEPHONE) 2 November 1995  see abstract  see column 2, line 34 - column 5, line 34  see column 8, line 28 - column 9, line 20  see claims  ---</p>	1-35
A	<p>US 5 056 109 A (GILHOUSEN KLEIN S ET AL) 8 October 1991  cited in the application  see abstract  see column 5, line 66 - column 6, line 13  see column 6, line 63 - column 7, line 50  see column 13, line 1-30  see column 13, line 45 - column 14, line 3  see column 14, line 42 - column 15, line 59  see figures 1,4,5  -----</p>	1-35

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No  
PCT/US 98/17528

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9508901	A	30-03-1995	FI 934113 A	21-03-1995
			AU 673464 B	07-11-1996
			AU 7658894 A	10-04-1995
			CN 1116033 A	31-01-1996
			EP 0670098 A	06-09-1995
			JP 8503833 T	23-04-1996
			NO 952002 A	13-07-1995
			US 5652748 A	29-07-1997
-----				
US 5640414	A	17-06-1997	US 5267261 A	30-11-1993
-----				
EP 0671819	A	13-09-1995	GB 2287379 A	13-09-1995
			CA 2142066 A	11-09-1995
			FI 951107 A	11-09-1995
			US 5574972 A	12-11-1996
-----				
EP 0680160	A	02-11-1995	JP 8018503 A	19-01-1996
			CA 2147922 A	28-10-1995
			CN 1115555 A	24-01-1996
-----				
US 5056109	A	08-10-1991	AT 163822 T	15-03-1998
			AU 646001 B	03-02-1994
			AU 6728390 A	31-05-1991
			CA 2072989 A	08-05-1991
			CN 1053870 A,B	14-08-1991
			CN 1090107 A,B	27-07-1994
			CN 1159720 A	17-09-1997
			DE 69032105 D	09-04-1998
			DE 69032105 T	08-10-1998
			EP 0500689 A	02-09-1992
			ES 2113862 T	16-05-1998
			FI 922083 A	07-05-1992
			GR 3026454 T	30-06-1998
			IL 96218 A	27-02-1994
			JP 2776632 B	16-07-1998
			JP 4502841 T	21-05-1992
			MX 172367 B	14-12-1993
			NO 304206 B	09-11-1998
			SG 48360 A	17-04-1998
			WO 9107037 A	16-05-1991
			US 5485486 A	16-01-1996
			US 5265119 A	23-11-1993
			US 5257283 A	26-10-1993
			US 5267262 A	30-11-1993